Research Article / *Araştırma Makalesi*

CAUSALITY RELATIONSHIP BETWEEN STOCK LIQUIDITY AND CORPORATE CASH HOLDINGS*

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ABSTRACT

Recent research documents evidence that stock liquidity and asset liquidity are associated. In the literature, some research finds the effect of asset liquidity on stock liquidity whereas some finds the effect of stock liquidity on corporate liquidity. This study examines the causality relationship between a firm's stock liquidity and its cash holdings. We use Granger causality for a dataset of listed non-financial companies. We find bidirectional causality between the two variables. The evidence shows that the causality from stock liquidity to cash holdings is weaker than the otherwise. Furthermore, our findings imply that investors are more reliant on firm's cash holdings for valuation of smaller firms. The results support that small firms have more information asymmetry.

Keywords: Cash holdings, Causality, Liquidity, Stock Liquidity.

HİSSE SENEDİ LİKİDİTESİ İLE İŞLETMELERİN NAKİT VARLIKLARI ARASINDAKİ NEDENSELLİK İLİŞKİSİ

ÖZET

Son araştırmalar hisse senedi likiditesi ile işletme likiditesinin ilişkili olduğuna dair kanıtlar raporlamaktadır. Literatürde, bazı araştırmalar işletme likiditesinin hisse senedi likiditesine etkisini incelerken, bazıları ise hisse senedi likiditesinin kurumsal nakit varlıklar üzerindeki etkisini incelemektedir. Bu çalışmada, hisse senedi likiditesi ile işletmelerin nakit varlıkları arasındaki nedensellik ilişkisi incelenmiştir. Granger nedensellik testi kullanılarak, finans sektörü dışındaki halka açık şirketlerin verileri analiz edilmiştir. Değişkenler arasında çift yönlü nedensellik ilişkisi bulunmuştur. Kanıtlar, hisse senedi likiditesinden nakit varlıklara doğru olan nedenselliğin, aksi yönlü nedensellikten daha zayıf olduğunu göstermektedir. Ayrıca bulgularımız, yatırımcıların daha küçük işletmelerin değerlemesinde, şirketlerin ellerindeki nakit varlıklara daha fazla güven duyduklarını göstermektedir. Sonuçlar, küçük işletmelerde daha fazla bilgi asimetrisi olduğu görüşünü desteklemektedir.

Anahtar Kelimeler: Hisse Senedi Likiditesi, Likidite, Nakit Varlıklar, Nedensellik.

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1. Introduction

Studies document that cash holdings of firms have increased dramatically for several decades. Thus, cash holdings have become one of the significant assets for companies. This phenomenon has causes and effects that many research studies examine the determinants and the implications of holding excess cash. There has been a large literature on the motives for holding cash. Recently further analysis investigates the effects of cash holdings on stock liquidity (Gopalan et al., 2012; Charoenwong et al., 2014; Hu et al., 2019; Nyborg & Wang, 2019). This paper focuses on the causality relationship between cash holdings and stock liquidity and the direction of the causality with evidence from an emerging market.

The research contributes to the literature in two ways. First, existing literature does not investigate the direction of the relationship between corporate cash holdings and stock liquidity. This paper fills this blank by investigating and finding a bidirectional causality relationship. Accordingly, corporate liquidity and market liquidity of the firm are interrelated. The second contribution is related to the size effect. The research suggests that size of the company matters in the relationship between stock liquidity and corporate liquidity.

Stock liquidity has gained interest in particular, after the global financial crisis of 2008. Stock liquidity refers to the capacity of a stock to be converted into cash at a short time at low cost without changing the price. Liquidity risk arises when a trader wants to convert the stock into cash. Thus, stock and market liquidity is a significant factor for investors.

The most common definition of liquidity is "the speed and ease with which an asset can be converted into cash" (Mishkin, 2014:132). We have two separate concepts of liquidity in this research: stock liquidity and corporate (or asset) liquidity. An asset is assumed to be "liquid if it can be converted into cash quickly and at low cost". Corporate liquidity is measured by the level of cash and liquid assets on a firm's balance sheet (Gopalan et al., 2012). In other words, corporate cash holdings and a company's liquidity of assets on the balance sheet represents a firm's corporate (asset) liquidity. Corporate liquidity shows a company's power to pay its short-term liabilities.

On the other side, stock liquidity is the ability to buy or sell stocks without affecting the price in a short time (Bodie et al., 2014:60). Thus, it relates to the willingness of traders to buy or sell and trading volume. It is measured by narrowness of bid-ask spread and trading volume. Increased stock liquidity may reduce the cost of equity and, hence, improve firm value and reduce leverage. The recent literature argue strong stock liquidity also increases a firm's tendency to hold cash (Chen et al., 2020). Furthermore, stock liquidity alleviates default risk by increasing price informativeness (Brogaard et al., 2017).

Recent research documents evidence that stock liquidity and asset liquidity are associated. In the literature, some research examines and finds the effect of asset liquidity on stock liquidity whereas some finds the effect of stock liquidity on corporate liquidity. The aim of this research is to examine the causality relationship between stock liquidity and corporate cash holdings. More importantly, we aim to find the direction of causality. Knowing the direction of the causality is important since corporate decision makers want to have control over the stock liquidity by their financial decisions. For example, if there is a link between market liquidity and corporate liquidity and the direction of causality is from corporate liquidity to

stock liquidity, thus increasing (or decreasing) the liquid assets held will increase the market liquidity of the company's share stock. In the meantime, we investigate whether size matters in this context. The main methodology that we employ to investigate the existence and the direction of causality is Granger causality method. For this purpose, we use a data set from the companies listed on Borsa Istanbul of Turkey.

In the second section, we review the preceding literature regarding stock liquidity, cash holdings, and the relationship between stock liquidity and corporate liquidity, and develop research hypotheses. In the third section, methodology and data of the research are described. Empirical results are presented and findings are remarked. In conclusion, the results are assessed and some implications are drawn out.

2. Literature Review and Hypotheses Development

There is a large research literature on cash holdings. The main research topics are the optimal cash level, determinants of cash holdings, and the relevance of corporate cash holdings to a firm's stock value. In this section, a brief literature review on corporate cash holdings and stock liquidity is presented. Afterwards, the prior studies on the relationship between stock liquidity and cash holdings are discussed, and hypotheses are developed accordingly.

The literature explains the relationship between cash holdings and stock liquidity with the help of asymmetric information and agency conflicts in a great extent. Managers may abuse excess cash for their own benefits against the interests of shareholders. Due to agency conflicts, managers should invest in positive net present value projects and distribute excess cash after placing the cash flows into these assets (Jensen & Meckling, 1976). Jensen (1986) remarks that distributing excess cash to shareholders will decrease the amount of assets under management's control, and hence, will reduce agency costs. In Jensen (1986), even in case of lack of sufficient cash holdings, management should borrow and pay out dividends to shareholders. Thus, debt provides control over management and reduces agency problems.

Myers & Majluf (1984) discuss that firms prefer internal financing over external financing due to asymmetric information between firm managers and investors. Asymmetric information problem is more severe for the firms with greater growth opportunities. Additionally, high-growth firms are exposed to greater financial distress and bankruptcy risk. Thus, firms with greater growth opportunities tend to hold more cash (Opler et al., 1999; Ozkan & Ozkan, 2004).

In efficient markets, cash holdings are irrelevant to the shareholder wealth. However cash holdings may affect firm performance and stock value due to imperfections such as agency conflicts, information asymmetries and financial distresses in the markets cash (Opler et al., 1999; Ozkan & Ozkan, 2004). Opler et al. (1999) did the first systematic research on the determinants of cash holdings. They suggest that firms hold more cash when cash flow is insufficient to place in investments and when outside capital is expensive. Their evidence supports static tradeoff theory, which implies there is an optimal point for cash holdings where marginal cost of each dollar equals benefit of holding each dollar.

Bates et al. (2009) examined why cash holdings are more than the needs of the companies. Riddick & Whited (2009) investigated the relationship between corporate cash holdings, income uncertainty and external financing costs. Brown & Petersen (2011) studied the effect of cash holdings on research and development expenditures during financial downturns.

Examining the determinants of cash holding policies with a large sample, Gao et al. (2013) found the agency problems lead to holding more cash. Breuer et al. (2017) investigated the relationship between investor preferences and cash management. Their findings suggest that the amount of cash holdings is related to the investors' preference for financially constrained firms. Cheung (2016) emphasized the positive impact of corporate social responsibility on cash holdings. Anderson & Hamadi (2016) examined and found the impact of ownership structure on cash holdings. Their results also show that managerial ownership is unrelated to the amount of cash holdings.

Another research area regarding cash holdings is whether cash holdings are related to the market value of companies. Faulkender & Wang (2006) investigate whether changes in equity values are associated with the variation in their cash holdings focusing on firm financial characteristics. Their evidence implies that firms with higher internal cash are perceived more valuable by the market. However, access to capital markets is an important factor which determines amount of cash holdings. Dittmar & Mahrt-Smith (2007) investigated the effect of corporate governance and cash holdings on a firm's valuation. They result that good governance improves the efficient use of cash holdings and enhances share value. Huang & Wang (2009) show how equity returns relates to cash holdings with a three-factor model. Their findings imply that cash increases the expected equity returns by increasing the expected return on physical capital.

Kim & Bettis (2014) examined the effect of cash holdings on firm performance. They found that cash holdings increase firm performance. Furthermore, they suggest that cash holdings are more significant in the valuation of larger firms. Nason & Patel (2016) investigated the role of cash on market performance during recession times. Their findings suggest that cash is positively associated to market value during downturns in which firms need cash more than other times. However, holding larger amount cash is not positively perceived by the market during a recession. Deb et al. (2017) investigated how firms benefit higher cash holdings. They suggest that cash is good for the companies which operate in highly competitive industries that require research expenditures and have high growth opportunities; and it is detrimental for the companies, which are poorly governed and have agency problems and information asymmetries.

Amess et al. (2015) synthesize the hitherto literature research on holding excess cash and they address two motives, which are precautionary motive against financial constraints, and agency conflicts. Additionally, due to agency and free cash flow problems there is a link between cash holdings and corporate governance. They note that managerial stock ownership, the structure of the board of directors and antitakeover provisions are the governance issues that set the framework of cash holdings in the literature.

Stock liquidity, also called market liquidity, refers to the liquidity of the stock market collectively. The issue has attracted the researchers initially with its links to excess returns and firm value. Some research suggests an inverse relationship between stock liquidity and stock returns (Acharya & Pedersen, 2005; Amihud & Mendelson, 1986). The higher required returns on low liquidity stocks drive firms to increase their stock liquidity. As a result, financial policies that will increase the liquidity may increase the firm value (Amihud & Mendelson, 1986). Fang et al. (2009) examined whether there is a relationship between a firm's stock

liquidity and performance. They found that stock liquidity increases firm performance and operating profitability. They explain that liquidity enhances the information content of firm's share value and increases performance based compensation of executives. Furthermore, more liquid stocks rely on more equity on the balance sheet.

The relationship between stock liquidity and dividends has also been another research concern. Banerjee et al. (2007) investigated U.S. firms and found a negative relationship between stock liquidity and dividends. Jiang et al. (2017) found that stock liquidity has informational content and drives corporate managers to pay out dividends. Using a sample from Chinese stock market, they reported that higher stock liquidity companies pay higher dividends, unlike the findings of Banerjee et al. Hu et al. (2019) examined the effect of stock liquidity on dividends. Their results support that high stock liquidity is associated with higher payouts.

Brogaard et al. (2017) examined the impact of stock liquidity on a firm's default risk. They report that stock liquidity and bankruptcy risk are negatively related. In a recent study, Chen et al. (2020) investigated the relationship between stock liquidity and excess leverage. Their findings suggest that a firm's stock liquidity decreases excess leverage by reducing information asymmetry.

The main focus of the paper is the causality relationship between stock liquidity and cash holdings which represent the asset liquidity of firms. The relationship between asset liquidity and stock liquidity has been investigated, specifically for the last decade. The findings and results are controversial so far.

Gopalan et al. (2012) examine the relationship and argue whether the liquidity of assets held by a company has an impact on stock liquidity. They investigate whether stock liquidity is affected by managerial investment decisions. They find a relationship between corporate liquidity and stock liquidity. This relationship may be positive or negative depending on the firm's investment position. More cash may support stock liquidity by lowering valuation uncertainty related to assets in which a firm has already invested (assets-in-place). More cash may also lower stock liquidity since it suggests future investments, hence uncertainty about future assets. Thus, the relationship between corporate liquidity and stock liquidity is strongly positive whereas the future investment opportunities are more certain. Shortly, the relationship is negative when firms are more likely to invest cash and liquid assets into uncertain investments (Gopalan et al., 2012).

Charoenwong et al. (2014) examine the relationship across a large number of countries, considering transparency and accounting practices. Their findings support the valuation uncertainty hypothesis developed by Gopalan et al. Their results show stock liquidity and asset liquidity are positively associated. In the firms with low quality accounting practices, the association is stronger. This suggests that investors value the asset liquidity structure in an environment in which there are high quality information and accounting standards. In their research, both Gopalan et al. (2012) and Charoenwong et al. (2014) rank the assets according to their liquidity degrees between zero and one, and then assign a liquidity score to each firm. Accordingly, cash holdings are the most liquid assets and their score is one.

Tayem et al. (2016) investigated the relationship between stock liquidity and asset liquidity in the context of ownership structure with a data set from Jordanian stock market.

Their results show that the association of stock liquidity and corporate liquidity may change depending on ownership concentration. Huang & Mazouz (2018) investigate how excess cash affects stock liquidity using a large sample of the US common stocks. They find that firms with higher levels of cash holdings have lower stock liquidity risk because firms which hold excess cash holdings are attractive for investors. Accordingly, Huang & Mazouz (2018) find that their results support the investment opportunities hypothesis, which suggests excess cash holdings support growth and investment opportunities for firms. Thus cash holdings attract investors and in turn, increase stock liquidity. However excess cash holdings are negatively associated to firm value because marginal value of excess cash is higher for less liquid firms.

Considering the discussions in the related literature, we develop two separate hypotheses upon the causality direction of the relationship between cash holdings and stock liquidity in this paper. Firms with excess cash would attract more investors, particularly uninformed investors (Gopalan et al., 2012; Huang & Mazouz, 2018). Thus, we test whether cash holdings enhance stock liquidity by hypothesizing that *the amount of cash holdings is a determinant of stock liquidity (H1)*.

Recent empirical research found a causality relationship from stock liquidity to cash holdings of firms. Hu et al. (2019) and Nyborg & Wang (2019) investigated whether stock liquidity has an effect on firms' cash holdings. In their research, they examined the causality direction from stock liquidity to asset liquidity. However, the findings of the studies related to the sign of the relationship are opposite. Hu et al. (2019) find that stock liquidity and cash holdings are negatively related. Accordingly, they suggest firms with higher stock liquidity reduce cash holdings. Contrarily, Nyborg & Wang (2019) find that firms with enhanced stock liquidity hold more cash. Their findings suggest that stock liquidity affects cash holdings. They explain the positive relationship with share repurchase motive of firms. Accordingly, the companies which have higher stock liquidity hold more cash to be able to repurchase their shares.

Another motive for this study is examine the direction of the causality relationship between corporate liquidity and stock liquidity. Considering the implications of Hu et al. (2019) and Nyborg & Wang (2019), we hypothesize that *stock liquidity is a determinant of corporate liquidity (that is amount of cash holdings) (H2)*. Knowing the direction of the causality will provide such important insights to both researchers and practitioners that corporate liquidity is determined endogenously, however, stock liquidity is assumed to result from the market dynamics.

3. Methodology and Data

As far as we know, this is the first study which examines the causality relationship between stock liquidity and cash holdings. We collect and analyze the data of non-financial companies from Borsa Istanbul. We employ Granger causality test in order to test linear causality and to determine the direction of the causality. Granger causality test examines the casual relationship between two stationary time series. Past values of one variable may be significant predictor of the current value of the other variable even if the second variable's past values are in the model. Thus, we can say that the first variable has a causal effect on the second variable. In the meantime, the reverse effect is possible. If so, there may be a bidirectional causality (Lopez & Weber, 2017).

3.1. Testing Causality

We apply Dumitrescu & Hurlin (2012) causality test. The test is an extended version of Granger causality test in heterogeneous panel data. Dumitrescu & Hurlin causality test employs a basic Granger causality regression analysis for each individual observation separately. The coefficients of the test may be different in the cross-sectional units. Thus, it can be applied in unbalanced panels or panels with different lag orders for each individual observation (Lopez & Weber, 2017).

We use Amihud's illiquidity ratio (2002) to measure stock liquidity.

$$Amihud_{i,t} = \frac{1}{D_{i,t}} X \sum\nolimits_{d=1}^{D} \frac{R_{i,t,d}}{Vol_{i,t,d}} \tag{1}$$

where $R_{i,t,d}$ is the rate of return for stock i on day d in period (a quarter in our study) t; $Vol_{i,t,d}$ is the trade volume, and $D_{i,t}$ refers the trading days number of stock i in a period. The period is a quarter in data set.

We multiply Amihud's illiquidity ratio by minus one after obtaining the natural logarithms to convert the formula into liquidity. Therefore, we state liquidity (*liq*) rather than illiquidity, by using

$$Liq_{i,t} = -\ln Amihud_{i,t} \tag{2}$$

On the other side, we measure corporate liquidity by cash holdings (cash) over total assets. Corporate cash holdings represent corporate liquidity, in other words, asset liquidity.

The financial statements of firms and related daily stock transactions data are collected from Public Disclosure Platform (kap.gov.tr) web site, which is administrated by an affiliate of Borsa Istanbul, and from Borsa Istanbul corporate web site (datastore.borsaistanbul.com), respectively.. We collect and analyze quarterly data from nonfinancial companies traded at Borsa Istanbul for the period from the first quarter of 2014 to the third quarter of 2019. Financial and utility companies are excluded from the data set as the researchers have done commonly since their line of business and accordingly financial statements are apart from the others. The final data set covers 52 firms' data out of BIST 100 Index companies. Thus, the full data set covers 1,144 firm-quarters.

We aim to determine whether size matters in the relationship between a firm's stock liquidity and its cash holdings. We break down the full data set into three subsets in accordance with the market capitalization of the companies. The thresholds for small companies and large companies are supposed to be one billion TL and five billion TL as of 2019, respectively. Thus, we presume that the companies which are larger than five billion TL market cap are large companies; the companies which are less than one billion TL market cap are small companies; and the companies between the two thresholds are medium size companies. These thresholds of size are determined by the author, considering the average size of the firms listed at Borsa Istanbul as an emerging stock market. We measure firm size as the natural logarithm of the market capitalization of firms as of the ending date of the research period and classify into groups. While not reported in the paper, we reclassify the companies according to the size

using the deflator-adjusted market values as of 2014, which is the beginning of the research period. This reclassification shows that the measure, we employed, does not materially affect the groups according to size, and hence, our conclusions.

In Table 1, we present the summary statistics of the data set. In the data according to the criteria described above, the data set covers 16 small firms, 18 medium size firms and 18 large firms. The mean values of the three subsets provide remarkable information. Mean values of cash holdings of small, medium and large firms are 4.8%, 14.2% and 17.9%, respectively whereas median values are 2.6%, 12.8% and 15.2%, respectively. This may suggest that larger firms have more cash holdings. On the other hand, mean values of stock liquidity are 17.03, 16.42 and 17.58 for small, medium and large firms' subsets. Moreover, the medians are very close figures. This may be an evidence for that stock liquidity does not change according to the size of firms listed on Borsa Istanbul. However, those are preliminary results, which are concluded from the descriptive statistics. We will obtain results that are more concrete by running statistical tests.

3.2. Empirical Results

We employ Pearson Correlation to examine the correlation between the two variables for a preliminary view. Table 2 reports the coefficients of correlations between the *cash* and *liq* variables for the full data and the subsets. The results show that the correlation between the two variables is significant for only small firms' subset. The coefficient is -0.23, and it suggests that corporate liquidity and stock liquidity shows an inverse relationship in small size firms. Increasing corporate liquidity is associated with decreasing stock liquidity for only small size firms. We find insignificance for the full data set and other subsets. These results suggest a weak relationship between the two variables. However, this is a preliminary analysis and we provide the results which are more concrete by employing causality tests.

We perform a panel unit root test to test the stationarity. We use ADF-Fisher and Phillips-Perron tests. If series are nonstationary, the Granger test cannot be applied. We find that cash variable is stationary and *liq* variable is nonstationary. Therefore, we derive the first difference of the liquidity variable. The first difference of *liq* variable provides stationarity. We present the panel unit root tests results in Table 3.

Table 1: Descriptive Statistics

	Full data			Large		
	n	**liq**	**cash**	**n**	**liq**	**cash**
Mean	1,144	17.00917	0.12601	396	17.58021	0.17880
Sd	1,144	2.66904	0.12752	396	2.37405	0.12562
kurtosis	1,144	0.63136	3.51181	396	-0.32642	2.83394
skewness	1,144	-0.75084	1.77805	396	-0.38969	1.61839
Median	1,144	17.42859	0.10125	396	17.99559	0.15247
Min	1,144	7.57208	0.00002	396	11.66885	0.00427
Max	1,144	22.65612	0.65849	396	22.42695	0.62640

	Medium			Small		
	n	**liq**	**cash**	**n**	**liq**	**cash**
Mean	396	16.42005	0.14244	352	17.02953	0.04812
Sd	396	3.12451	0.13511	352	2.26033	0.07151
kurtosis	396	0.16961	2.71691	352	0.42592	23.71893
skewness	396	-0.69546	1.65819	352	-0.74520	4.08203
Median	396	17.05273	0.12756	352	17.38142	0.02558
Min	396	7.57208	0.00071	352	8.97347	0.00002
Max	396	22.65612	0.63043	352	22.06821	0.65849

Table 2: Correlation Coefficients

		Full Data Set	Large Firms	Medium Firms	Small Firms
		Liq	**Liq**	**Liq**	**Liq**
Cash	Pearson Correlation	-0.0088	-0.0388	0.0416	-0.2343*
	Sig. (2-tailed)	0.7725	0.4515	0.4200	0.0000
	N	1144	396	396	352

*Note. * denotes 5 percent level of significance.*

Table 3: Unit Root Test Results

	Unit root tests	**liq**	**cash**
Level	ADF - Fisher	75.14	214.50*
	Phillips-Perron	79.00	341.46*
first difference	ADF - Fisher	521.10*	
	Phillips-Perron	1085.34*	

*Note. * denotes the rejection of the null hypothesis (contain unit roots) at the 0.1 percent levels of significance.*

Table 4: Results of Dumitrescu & Hurlin Causality Tests for the Full Data Set

	K1		K2		K3	
Causality Direction	W-Stat.	Zbar-Stat.	W-Stat.	Zbar-Stat.	W-Stat.	Zbar-Stat.
Liq - Cash	1.3098	1.5798	2.2679	0.9659	2.9747	-0.0744
Cash - Liq	1.1182	0.6028	3.4546	5.2446***	4.7296	5.0918***

	K4		K5	
Causality Direction	W-Stat.	Zbar-Stat.	W-Stat.	Zbar-Stat.
Liq - Cash	4.5829	1.4862	9.0517	9.2394***
Cash - Liq	5.8776	4.7871***	9.3902	10.0113***

*Notes. ***, **, and * denote the rejection of the no causality at the 0.1, 1, and 5 percent levels of significance, respectively. K is the lag number.*

Table 5: Dumitrescu & Hurlin Causality Test Results of Different Sizes

	Full data		Large	
Causality Direction	W-Stat.	Zbar-Stat.	W-Stat.	Zbar-Stat.
Liq - Cash	9.0517	9.2394***	13.7228	11.7028***
Cash - Liq	9.3902	10.0113***	6.2161	1.6316

	Medium		Small	
Causality Direction	W-Stat.	Zbar-Stat.	W-Stat.	Zbar-Stat.
Liq - Cash	8.1121	4.1753***	4.8538	-0.1849
Cash - Liq	8.3458	4.4888***	14.1362	11.5564***

*Note. ***, **, and * denote the rejection of the null hypothesis (no causality) at the 0.1, 1, and 5 percent levels of significance, respectively.*

Table 4 exhibits the results of Dumitrescu & Hurlin (2012) causality tests according to the lagged periods. Cash Granger causes stock liquidity with a lag of two periods while stock liquidity Granger causes cash holdings with a lag of five periods. Considering the periods are quarters in the study, K5 represents one year and a quarter. That also suggests that annual values may be more indicative of stock liquidity than quarterly figures. Thus, we find bidirectional causality between two measures. With these results, the hypotheses H1 and H2 are both satisfied. The test statistics support that cash holdings Granger cause stock liquidity, and stock liquidity Granger causes cash holdings, as well. The results imply that the causality from stock liquidity to cash holdings is weaker than the otherwise. Furthermore, we examine the relationship of two variables, dividing the full data into subsets according to size. The results of causality tests for subsets are presented in Table 5.

For large firms, we find a Granger causality from stock liquidity to cash holdings, nevertheless cash holdings do not Granger cause stock liquidity. For medium firms, there is bidirectional causality between two measures. Interestingly, for small firms, the direction of the

causality is the inverse of the large firms. We find unidirectional Granger causality from cash holdings to stock liquidity. There is not a causality from stock liquidity to cash holdings while cash holdings Granger cause stock liquidity.

According to those findings, stock liquidity is a determinant of cash holdings for larger companies whereas cash level is a determinant of stock liquidity for smaller companies. The results suggest that the managers of smaller companies may intervene in companies' stock liquidity with their decision-making on how much cash they should hold. The results support the view that small firms are more vulnerable to market imperfections such as information asymmetry (Almeida et al., 2004; Faulkender & Wang, 2006). However, our results on firm size are not robust due to the limitations of the data set and the methodology employed. The findings regarding the bidirectional causality support the preceding literature that there is a relationship between corporate liquidity and stock liquidity.

4. Conclusion

This paper examines the causal relationship between a firm's stock liquidity and its corporate cash holdings from an emerging market, namely Borsa Istanbul of Turkey. We use a data set of the companies listed on Istanbul Stock Exchange. Our study reveals that the cash holdings of nonfinancial companies have a causal effect on stock liquidity. Moreover, the relationship between corporate cash holdings and company's stock liquidity is bidirectional. The results suggest that the changes in corporate cash holdings may help to predict the future changes in stock liquidity and vice versa. For larger firms, the causality is from market liquidity to cash holdings. Inversely, we find that the causality is from cash holdings to market liquidity for small firms. The findings imply that investors consider corporate liquidity for valuation of smaller firms. For larger firms, investors do not consider cash holdings as a valuation parameter or as an incentive to trade. Rather, market liquidity effects cash holdings of large companies. Our findings also show that corporate executives may manage firms' asset structure to affect stock liquidity. Finally, the results suggest that corporate finance decisions may affect stock liquidity since increasing (or decreasing) cash holdings will have an impact on stock liquidity.

As far as we know, this is the first paper which examines the causality for stock liquidity and corporate liquidity. In the meantime, we investigate the size factor for this relationship. The findings show remarkable results for the size factor. The results support that small firms have more information asymmetry. For further studies, we recommend to examine industry, ownership and free float rate factors to the researchers in this field.

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